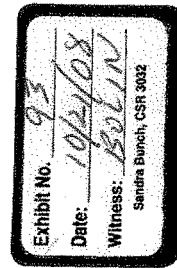


	A	RP's remedial feasibility study (11/4/99) concludes: "... air sparging is probably not feasible because the saturated zone is composed primarily of very fine-grained soils ... a substantial fraction of the NAPL may not flow into the pumping well ... and will remain trapped in the submerged soil. This residual NAPL ... will continue to dissolve into the groundwater during the remediation process." "Previous pump and treat operations at the subject site have had only limited success at reducing dissolved hydrocarbon concentrations in groundwater." "The feasibility of DPE for the subject site is questionable."
51		RP's remedial feasibility study (11/4/99) suggests to the tune of recommending discontinuation of groundwater remediation and leaving hydrocarbons remaining in soil and groundwater after excavation ... to decline through natural attenuation ... including ... dispersion ... meaning continued migration off site.
52		Historic MTBE and TBA gw plumes have not been delineated laterally.
53		Recent MTBE and TBA gw plumes have not been delineated laterally.
54		MTBE and TBA gw plumes have not been delineated vertically.
55		RP consultant states
56		RP left site monitoring wells MW-49 (screened 3.5 to 23.5 ft bgs across) and MW-51 (screened 4.5 to 19.5 ft bgs) capped and buried on site.
57		9 gw production wells located within 1 mile radius of site:
58		HB-1 - 1,750 ft W of site - screen 265 - 291
59		WM-99 - 3,000 ft NW of site - screen 333 to 361.
60		TMIX-WM - 3,000 ft N of site - screen unknown.
61		SHAF-WM - 3,000 ft NW of site - screen unknown.
62		HB-4 - 3,750 ft NW of site - screen 252 to 804.
63		HB-7 - 3,500 ft NW of site - screen 263 to 879.
64		HBHS-WM - 4,750 ft NE of site - screen 426 to 437.
65		WM-8 - 5,000 ft NW of site - screen 130 to 330.
66		SCE-WBOL - 5,000 ft E of site - screen unknown.
67		Nearest drinking water production well: HB-1 - ~1,800 ft W of site.
68		Drilled to 306 ft bgs.
69		Screened 265 to 291 ft bgs.
70		Pump rate - ~790 gpm
71		Top of Shallow zone - ~61 ft bgs.
72		Bottom of Shallow zone - ~171 ft bgs.
73		Top of Principal Aquifer - ~187 ft bgs.
74		
75		Nearest MTBE detection in drinking water production well:
76		HB-7: 0.16 ug/L in 2006 (LIMS).
77		HB-13: 0.17 ug/L in 2005 (LIMS).
78		
79		
80		
81		
82		

	A	
1	Westminster Shell	
2	5981 Westminster Blvd, Westminster, CA	
3		
4		
5	Site had multiple fuel leaks between 1985 and the present, including fuel leaks that were detected or identified on 11/20/85 and 9/1/92, and discovered or indicated in late 1993 and Jan-02.	
6		
7	Site had at least 58 UST inspection failures or violations in 23 inspections, including excess inventory variations, from 2/13/1990 to 2/1/2001.	
8		
9	Site was closed on 9/14/87, but investigation some remediation continued until the site was reopened 1/18/01 by regulatory agency owing to unmitigated and undelineated contamination.	
10	Regulatory Agency has issued at least 15 notifications to RP from 12/30/85 to 8/6/03 for inadequate or ineffective investigations, work plans, reports, and remediation.	
11		
12	MTBE 1st tested in groundwater: 4/25/96 in MW-6.	
13	MTBE 1st detected in groundwater: 4/25/96 in MW-6 - 26,000 ug/L	
14	Max MTBE detected in a gw monitoring well: 12/17/97 in MW-7 - 110,000 ug/L	
15		
16	TBA 1st tested in groundwater: 12/21/00 in MW-6	
17	TBA 1st detected in groundwater: 12/21/00 in MW-6 - 3500 ug/L	
18	Max TBA detected in a gw monitoring well: 12/18/02 in MW-3 - 14,000 ug/L	
19		
20	4 saturated zones are identified:	
21	semi-perched gw zone - from -5 to -30 ft bgs (all MWs screened various intervals between 5 & 30 ft bgs).	
22	EXCEPT: MW-13B (screened 30 to 35 ft bgs) and MW-13C (screened 49 to 54 ft bgs) - installed in 9/01.	
23		
24	Alpha Aquifer - estimated at ~185 ft bgs.	
25		
26	Farthest downgradient well MW-9 1st tested for MTBE in 2/14/96.	
27	Max MTBE detected Aug-97 at 90 ug/L	
28		
29	Semi-perched groundwater flow direction is SW (Komex report)	
30	Deeper groundwater flow direction is SW (OCWD)	
31	Vertical groundwater gradient is down.	
32		
33	Remediation: partial groundwater capture (DPE) ~1988 to 1999, and 2001 to 2005.	
34	RP conducted DPE test, concluding that DPE would be feasible.	
35	RP started DPE remediation 1/88, ~3 yrs after determining DPW would be feasible.	
36	RP stopped DPE remediation 3/99, removing <35 gallons of TPH-G.	
37	RP conducted DPE test, concluding 40-foot radius of influence.	
38	RP re-started DPE remediation in Jan-01.	
39	4 years after max MTBE detected on site (110,000 ug/L in MW-7 12/17/97).	
40	4 years after max MTBE detected downgrad border well MW-3 (28,000 ug/L 1/23/97; 100,000 ug/L 3/7/01)	
41	4 years after maximum MTBE detected in furthest off-site downgrad well (90 ug/L in MW-9 8/8/97).	
42	DPE system failed - stopped in Jul-05, RP proposed to discontinue DPE remediation permanently.	
43	TPH, benzene, MTBE (>1,000 ug/L), TBA (>2,000 ug/L), DIPE in gw beneath site after stopping DPE remediation	
44		
45	MTBE and TBA groundwater plumes have migrated off site to the SW (1/28/08 WPI - Quarterly Status and Groundwater Monitoring Report, 4 th Quarter 2007) Former Shell Service Station, 5981 Westminster Boulevard (at Springdale Street), Westminster, California, OCHCA Case #93UT52	
46		
47	Historic MTBE and TBA gw plumes have not been delineated laterally.	



OCWD-MTBE-001-192594

A	
48	Recent MTBE and TBA gw plumes have not been delineated laterally.
49	MTBE and TBA gw plumes have not been delineated vertically.
50	
51	MTBE & TBA gw plumes not only NOT delineated vertically, NOT even investigated (except MW-13A -13B -13C).
52	
53	Groundwater conduits are near by (potential migration paths from shallow saturated zones to deeper saturated zones):
54	Nearest well: W-2399 - domestic well ~1,500 ft S of site.
55	Drilled to 670 ft bgs.
56	Screened 281 to 327, 449 to 465, and 597 to 610 ft bgs.
57	pump rate - unknown.
58	Nearest drinking water production well: HB-4 - ~3,100 ft S of site.
59	Drilled to 826 ft bgs.
60	Screened 252 to 804 ft bgs.
61	Pump rate - 3000 gpm.
62	Top of Shallow zone - ~46 ft bgs.
63	Bottom of Shallow zone - ~159 ft bgs.
64	Top of Principal Aquifer - ~169 ft bgs.
65	
66	Nearest MTBE detection in drinking water production well:
67	HB-7: 0.16 ug/L in 2006 (LIMS).
68	HB-13: 0.17 ug/L in 2005 (LIMS).

OCWD-MTBE-001-192595

Chevron #1921

3901 S. Bristol Street, Santa Ana

Fuel leaks were detected at the site in 1988 and 1990 during tank upgrades / replacements (Radian, 8/3/90, *Soil and Groundwater Investigation at Chevron Station No. 1921, Santa Ana, California*; Harding ESE, 3/21/02, *Groundwater Monitoring Wells Installation Report, Chevron Service Station No. 9-1921, 3801 South Bristol Street, Santa Ana, California CRWQCB Case No. 083001181T*).

RP missed multiple work plan and reporting deadlines, and did not include requested data and information in work plans and reports.

MTBE 1st tested in gw: 7/23/96 in MW-02.

MTBE 1st detected in groundwater: 7/23/96 in MW-02 - 830 ug/L.

Max MTBE detected in a gw monitoring well: 9/9/98 in MW-06 - 200,000 ug/L.

TBA 1st tested in groundwater: 10/18/00 in MW-06 (ND<2000 ug/L - detected the next time tested in well).

TBA 1st detected in groundwater: 1/16/01 in MW-06 - 59,100 ug/L.

Max TBA detected in a gw monitoring well: 1/16/01 in MW-06 - 59,100 ug/L.

2 saturated zones are identified (Radian):

semi-perched gw zone: from ~25 to >40 ft bgs.

Talbert Aquifer - ~80 ft bgs.

Off Site, Farthest downgradient wells - MW-13 & MW-15:

MTBE 1st tested: 7/23/96 in MW-13 - ND<10 ug/L.

MTBE 1st detected: 1/16/97 in MW-15 - 1.2 ug/L.

Max MTBE: 1/22/08 in MW-15 - 0.06J ug/L.

TBA 1st tested: 10/18/00 in MW-13 - ND<20 ug/L.

TBA 1st detected: 1/2/07 in MW-13 - 41 ug/L.

Max TBA: 4/7/08 in MW-13 - 1,000 ug/L.

BUT MW-13 & MW-15 not in optimum position / screened interval (see SAIC - Fig 3, 7-3-07 GW Elev map).

MW-14 is farthest downgradient well from probable source (USTs); MW-14 on site margin:

MTBE 1st tested in MW-14: 7/23/96.

MTBE 1st detected in MW-14: 7/23/96 - 300 ug/L.

Max MTBE detected in MW-14: 4,230 ug/L.

TBA 1st tested in MW-14: 10/18/00 (ND<1000 ug/L - detected next time tested).

TBA 1st detected in MW-14: 1/16/00 - 98 ug/L.

Max TBA detected in MW-14: 1.300 ug/L.

Semi-perched groundwater flow direction is W to S (SAIC report).

Deeper groundwater flow direction is W (ref OCWD).

Vertical groundwater gradient is down (OCWD).

Remediation: initiated 2005 to 2006: overpurge selected wells; **NO groundwater capture initiated.**

late 1988 - UST removal - free product observed on water (later observed in 3 wells: MW-4, -5, -7).

Mar-91 - VE test.

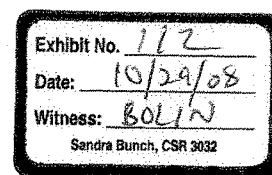
Aug-02 - free product observed - MW-05R.

Feb-03 - free product observed - MW-05R.

2005 to 2006 - overpurge selected wells.

Sep-07 - proposes to install DPE system - **9 yrs after free product discovered.**

MTBE and TBA groundwater plumes have migrated off site W - SW - S, but especially SW (9/25/07 SAIC - *Submittal of 3rd Quarter 2007 Progress and Groundwater Monitoring Report, Chevron Service Station No. 9-1921, 3801 South Bristol Street, Santa Ana, CRWQCB Case No. 083001181T*).



Historic MTBE and TBA gw plumes have not been delineated laterally.
Recent MTBE and TBA gw plumes have not been delineated laterally.
MTBE and TBA gw plumes have not been delineated vertically.

Groundwater conduits are near by (potential migration paths from shallow saturated zones to deeper saturated zones):

Nearest well: W-4516 - domestic well ~335 ft NE of site:

Drilled to 220 ft bgs (in Principal Aquifer).

Screened _unknown_ ft bgs.

pump rate - unknown.

Top of Shallow zone - ~38 ft bgs,

Bottom of Shallow zone - ~134 ft bgs.

Top of Principal Aquifer - ~157 ft bgs.

Nearest pumping well: MTSN-SA - ~1,890 ft W of site - agr/irr well.

Drilled to 914 ft bgs (in Principal Aquifer).

Screened: unknown

pump rate - unknown.

Top of Shallow zone - ~32 ft bgs,

Bottom of Shallow zone - ~130 ft bgs.

Top of Principal Aquifer - ~148 ft bgs.

Nearest drinking water production well: MCWD-1B - ~5,850 ft W of site.

Drilled to 612 ft bgs (in Principal Aquifer).

Screened: 305-335, 350-390, 440-500, and 540-580 ft bgs.

Pump rate - ~3000 gpm.

Top of Shallow zone - ~32 ft bgs,

Bottom of Shallow zone - ~139 ft bgs.

Top of Principal Aquifer - ~160 ft bgs.

Nearest MTBE detection in drinking water production well:

NONE yet.

Arco #3085

3361 S. Bristol Street, Santa Ana

Fuel leaks were detected at the site in 1993 during facility (tanks, dispensers, and/or pipes) upgrades / replacements (4/19/02 Secor - Remedial Action Plan, Former Arco Facility 3085, 3361 South Bristol Street, Santa Ana, California, RWQCB Case No. 083002237T).

MTBE 1st tested in gw: 6/12/98 in MW-1.

MTBE 1st detected in groundwater: 6/12/98 in MW-1 - 3,500 ug/L.

Max MTBE detected in a gw monitoring well: **2/11/04 in MW-SVE-10 - 340,000 ug/L.**

TBA 1st tested in groundwater: 7/8/00 in MW-SVE-13 (ND<4,000 ug/L - detected 3rd time tested at 1,200 ug/L).

TBA 1st detected in groundwater: 10/16/00 in MW-1 - 620 ug/L (previous test was at detect limit 2,000 ug/L).

Max TBA detected in a gw monitoring well: **9/25/06 in AS-14 - 55,000 ug/L.**

2 saturated zones are identified (Komex):

"shallow" semi-perched gw zone: from ~3 to 18 ft bgs.

"deeper" semi-perched gw zone: from ~3 to >30 ft bgs.

Alpha Aquifer - top at ~65 to 80 ft bgs.

Off Site, Farthest downgradient wells: MW-4 to the S; & MW-5 to the SE:

Off-site Well **MW-4 in south direction:**

MTBE 1st tested: 6/12/98 in MW-4.

MTBE 1st detected: 6/12/98 in MW-4 - 80 ug/L - **MTBE migrated SOUTH off site before first tested.**

Max MTBE: 11/15/02 in MW-4 - 380 ug/L.

TBA 1st tested: 7/18/00 in MW-4 (at detection limit 50 ug/L).

TBA 1st detected: 10/16/00 in MW-4 - 25 ug/L.

Max TBA: 9/25/06 in MW-4 - 180 ug/L.

Off-site Well **MW-5 in southeast direction:**

MTBE 1st tested: 10/2/01 in MW-5.

MTBE 1st detected: 10/2/01 in MW-5 - 170 ug/L - **TBA migrated SOUTHEAST off site before first tested.**

Max MTBE: 11/5/02 in MW-5 - 220 ug/L.

MTBE 1st tested: 10/2/01 in MW-5.

TBA 1st detected: 10/2/01 in MW-5 - 7.4J ug/L - **TBA migrated SOUTHEAST off site before first tested.**

TBA 1st detected: 10/2/01 in MW-5 - 7.4J ug/L (tested at detect limit up to 100 ug/L).

Semi-perched groundwater flow direction is S (Komex report).

Deeper groundwater flow direction is SW (Komex report).

Vertical groundwater gradient is down (Komex).

Remediation: AS/SVE initiated 1999; **NO groundwater capture initiated.**

Apr-93 - facility upgrade and repair - detected contamination in soil and groundwater.

Feb-97 - USTs and above ground station facility removed.

cir late 1997 to 1998 - In-N-Out Burger restaurant constructed on site.

Jun-98 - 1st test MTBE farthest south downgradient well (MW-4) - MTBE plume already migrated past MW-4.

Feb-99 - SVE initiated at the site - **6 yrs after release occurred and gw contamination detected.**

Aug-99 - AS initiated to augment SVE - **6 yrs after release occurred and gw contamination detected.**

Oct-01 - 1st test TBA farthest southeast downgradient well (MW-5) - TBA plume already migrated past MW-5.

Sep-01 - HVDPE test performed.

Feb-02 - RWQCB approval withheld for proposed enhanced bioremediation - contaminant concentration too high.

MTBE and TBA groundwater plumes have migrated off site S and SE (4/30/08 Delta - Quarterly Monitoring Report Submittal [First Quarter 2008], CRWQCB Case No. 083002237T).

Exhibit No.	134
Date:	10/30/08
Witness:	BOLIN
Sandra Bunch, CSR 3032	

Historic MTBE and TBA gw plumes have not been delineated laterally.
Recent MTBE and TBA gw plumes have not been delineated laterally.
MTBE and TBA gw plumes have not been delineated vertically.

Groundwater conduits are near by (potential migration paths from shallow saturated zones to deeper saturated zones):

Nearest wells: W-2130 (domestic), W-4475 (domestic), & W-4478 (agr/irr) - ~1,250 ft S of site:

all 3 wells are downgradient in Shallow Aquifer.

Well W-2130 - drilled to 182 ft bgs (in Principal Aquifer).

Screened 123 to 130 ft bgs in Shallow Aquifer, and 175 to 180 ft bgs in Principal Aquifer.

NO SANITARY SEAL

pump rate - unknown.

Top of Shallow zone - ~24 ft bgs,

Bottom of Shallow zone - ~140 ft bgs.

Top of Principal Aquifer - ~163 ft bgs.

Well W-4475 - drilled to 466 ft bgs (in Principal Aquifer).

Screened 205 to 230 ft bgs and 379 to 384 ft bgs, both in Principal Aquifer.

NO SANITARY SEAL

pump rate - unknown.

Top of Shallow zone - ~35 ft bgs,

Bottom of Shallow zone - ~148 ft bgs.

Top of Principal Aquifer - ~171 ft bgs.

Well W-4478 - unknown depth bgs (probably in Principal Aquifer).

Screened 367 to 450 ft bgs in the Principal Aquifer.

NO SANITARY SEAL

pump rate - unknown.

Top of Shallow zone - ~35 ft bgs,

Bottom of Shallow zone - ~146 ft bgs.

Top of Principal Aquifer - ~170 ft bgs.

Nearest drinking water production well: SA-34 - ~2,100 ft NW of site (downgradient in Principal Aquifer).

Drilled to 1,000 ft bgs (in Principal Aquifer).

Screened: 370 to 810 ft bgs in Principal Aquifer.

Pump rate - ~4,300 gpm.

Top of Shallow zone - ~35 ft bgs,

Bottom of Shallow zone - ~181 ft bgs.

Top of Principal Aquifer - ~206 ft bgs.

Nearest MTBE detection in drinking water production well:

NONE yet.

Thrifty #008

704 N. Bristol Street, Santa Ana

Fuel leaks were detected at the site in 1993, 1994, 1996, and 1999 during facility (tanks, dispensers, and pipes) upgrades / replacements and as a result of inventory shortages (Unauthorized release reports).

Regulating Agency cited multiple deficiencies, made numerous requests for additional investigation and remediation, particularly in last 10 years.

MTBE 1st tested in gw: Jun-97 in TDD-2.

MTBE 1st detected in groundwater: Jun-97 in TDD-2 - 36,000 ug/L.

Max MTBE - unmeasured in a gw monitoring well: 5/55/96 in BW-5 - **FREE PRODUCT** (at 1% = 10,000,000 ug/L).

Max MTBE - measured in a gw monitoring well: Jun-97 in TDD-2 - 36,000 ug/L.

TBA 1st tested in groundwater: 1/12/00 in TDD-2 (elev detect limit - ND<25,000 ug/L; detected later at >1000 ug/L).

TBA 1st detected in groundwater: 4/27/00 in TDD-2 - 1,510 ug/L (previously tested at 25,000 ug/L in 1/12/00).

Max TBA detected in a gw monitoring well: 7/20/00 in TDD-2 - 2,770 ug/L.

3 saturated zones are identified (Komex):

"Upper" semi-perched gw zone: from ~23 to 30 ft bgs.

"Lower" semi-perched gw zone: from ~50 to 102 ft bgs.

Alpha Aquifer: top ~125 ft bgs.

Off Site, Farthest downgradient well: MW-28 to the SW (>500 ft SW of site):

MTBE 1st tested: 4/8/03 in MW-28 (per Geotracker).

MTBE 1st detected: 4/8/03 in MW-28 - 43 ug/L (MTBE plume already migrated past MW-28).

Max MTBE: 1/25/05 in MW-28 - 148 ug/L.

TBA 1st tested: 4/8/03 in MW-28.

TBA 1st detected: 1/20/04 in MW-28 - 10 ug/L.

Max TBA: 1/25/05 in MW-28 - 29 ug/L.

Off-site Well MW-26 to the SW (~250 ft SW of site):

MTBE 1st tested: 12/3/02 in MW-26.

MTBE 1st detected: 12/3/02 in MW-26 - 575 ug/L (MTBE plume already migrated past MW-26).

Max MTBE: 7/9/03 in MW-26 - 2,380 ug/L.

TBA 1st tested: 12/3/02 in MW-26.

TBA 1st detected: 12/3/02 in MW-26 - 138 ug/L (TBA plume already migrated past MW-26).

Max TBA: 7/9/03 in MW-26 - 406 ug/L.

TPH plume (100 ug/L Isoconcent) ~400 ft from site in Feb-07 -VERY LONG- don't often see TPH plumes this long.

MTBE has been detected in soil (unsaturated zone) >150 ft downgradient from site - VERY LONG PLUME.

MTBE concentration pulses in farthest downgradient well (BW-28) in 2007/08.

"Upper" semi-perched groundwater flow direction is SW (Komex report).

"Lower" semi-perched groundwater flow direction is SW (Komex report).

Deeper groundwater flow direction is SW (Komex report).

Vertical groundwater gradient is down (Komex).

Remediation: DPE initiated 2000 on site, 2002 off site; NO groundwater capture initiated - plume >500 ft long.

Jul-87 - waste oil UST removed - began site investigation - detected gasoline in soil & groundwater.

Mar-99 - USTs, piping, and dispensers removed from site; soil excavation.

Jun-99 - began near off-site investigation (BW-9 & BW-10) ~12yrs after 1st detection - LONG DELAY.

Jul-00 - DPE initiated on site - 13yrs after 1st detection; 1yr after 2nd detection.

Mar-03 - current MAX DOWNGRAIENT well BW-28 installed ~500 ft from site.

MTBE detected 1st sample; MTBE plume already migrated past BW-28 - 15yrs after contam detected.

Jun to Aug-02 - DPE initiated off site - 15yrs after 1st detection; 3yrs after 2nd detection.

May-03 - ORC injection conducted.

2004 to 2008 - periodic on-site and off-site DPE and/or perozone test conducted.

MTBE and TBA groundwater plumes have migrated off site southwest (12/30/02 Cornerstone Environmental Assoc. - Additional Offsite Assessment Report).

Historic MTBE and TBA gw plumes have not been delineated laterally.

Recent MTBE and TBA gw plumes have not been delineated laterally.

MTBE and TBA gw plumes have not been delineated vertically.

Groundwater conduits are near by (potential migration paths from shallow saturated zones to deeper saturated zones):

Nearest well - W-2112 ~800 ft SW of site; ~400 ft SW of BW-28 (MTBE contaminated well):

Drilled to 520 ft bgs (Principal Aquifer).

Screened _unknown_ ft bgs; sanitary seal - unlikely (completed in 1946).

pump rate - (unknown) inactive?

Nearest production well - SA-16: ~2,200 ESE of site:

Drilled to 978 ft bgs (Principal Aquifer).

Screened: 305 to 950 ft bgs; NO Sanitary Seal (completed in 1932).

pump rate - 1,568 gpm (bowl depth 230 ft bgs).

Nearest MTBE detection in drinking water production well:

SA-16: 0.13 ug/L in 2005.

SA-16: 0.28 ug/L in 2008.

Thrifty #376
801 N. Bristol Street, Santa Ana
Fuel leaks were detected at the site in 1994 and 2003 during facility (tanks, dispensers, and pipes) upgrades / replacements and as a result of inventory shortages (Unauthorized release reports).
Regulating Agency cited multiple deficiencies, made numerous requests for additional investigation and remediation, particularly in last 10 years.
MTBE 1st tested in gw: Jul-97 in TDD-4 (per Komex)
MTBE 1st detected in groundwater: Jul-97 in TDD-4 - 130,000 ug/L (per Komex).
Max MTBE - unmeasured in a gw monitoring well: Sep-95 in W5-S - FREE PRODUCT (at 1% = 10,000,000 ug/L).
Max MTBE - measured in a gw monitoring well: Jun-00 in W5-SR - 671,000 ug/L.
TBA 1st tested in groundwater: 3/23/00 in W-SSR (elev detect limit - ND<1,000,000 ug/L; detected later in 1000s ug/L).
TBA 1st detected in groundwater: 6/21/01 in W-SSR - 31,800 ug/L (previously tested at 25,000 ug/L in 1/12/00).
Max TBA detected in a gw monitoring well: 12/11/03 in W5-SR - 385,000ug/L.
3 saturated zones are identified (Komex):
"Upper" semi-perched gw zone: from ~23 to 30 ft bgs.
"Lower" semi-perched gw zone: from ~48 to 102 ft bgs.
Alpha Aquifer: top ~125 ft bgs.
Off Site, Farthest downgradient well - WEST: W14:
MTBE 1st tested: 9/12/00 in W-14.
MTBE 1st detected: 9/12/00 in W-14 - 157 ug/L (MTBE plume already migrated past W-14 when 1st tested).
Max MTBE: 9/12/00 in W-14 - 157 ug/L.
TBA 1st tested: 9/12/00 in W-14.
TBA 1st detected: 9/12/00 in W-14 - ND<20 ug/L.
Max TBA: ND<20 ug/L.
Off-site contaminant migration indicated - MTBE detected in site margin wells in all directions:
W-10s - W direction - max MTBE - 47,900 ug/L on 6/7/00.
W-13s - SW direction - max MTBE - 7,500 ug/L on 9/12/00.
W-3s - S direction - max MTBE - 46,000 ug/L on 9/12/00.
W-7s - SE direction - max MTBE - 3,480 ug/L on 6/7/00.
W-17 - ESE direction - max MTBE - 6,210 ug/L on 6/21/01.
W-16 - NE direction max MTBE - 394 ug/L on 3/23/00 (1st time tested).
W-9 - N direction - max MTBE - 421 ug/L on 9/12/00.
W-15 - NW direction - max MTBE - 5,560 ug/L on 9/13/01.
"Upper" semi-perched groundwater flows in all directions - mounded in south part of site (Komex report).
"Lower" semi-perched groundwater flow direction is NW to S (Komex report).
Deeper groundwater flow direction is SW (Komex report).
Vertical groundwater gradient is down (Komex).

Exhibit No.: 171
5 November 2008
Harry A. Paller, California CSR No. 7708

OCWD-MTBE-001-253389

Remediation: DPE initiated 2001; NO groundwater capture initiated.
Dec-94 - USTs and piping removed, soil excavated.
Aug-95 - initial site assessment.
Jan-98 - free product is detected (in well W-5S) - free product removal by hand bailing.
May-01 - initiated DPE system (installed Jan-03) - remediation initiated ~7yrs after contamination detected.
Nov-03 - periodic overpurgings initiated in selected wells - ~6yrs after free product is detected.
Jan-07 - RWOCB sends letter to Thrifty - indicates MTBE & TBA PLUMES MIGRATING DOWNWARD.
"... significant increases [of MTBE & TBA] in deep-interval wells that were historically non-detected ..."
MTBE and TBA groundwater plumes have migrated off site WNW and E (1/28/08 Thrifty Oil Co. - Fourth Quarter 2007 Status Report).
Historic MTBE and TBA gw plumes have not been delineated laterally.
Recent MTBE and TBA gw plumes have not been delineated laterally.
MTBE and TBA gw plumes have not been delineated vertically.
Groundwater conduits are near by (potential migration paths from shallow saturated zones to deeper saturated zones):
Nearest well - W-2112 ~1000 ft SW of site:
Drilled to 520 ft bgs (Principal Aquifer).
Screened - unknown - ft bgs; sanitary seal - unlikely (completed in 1946).
pump rate - (unknown) inactive?
Nearest production well - SA-16: ~1,875 SE of site:
Drilled to 978 ft bgs (Principal Aquifer).
Screened: 305 to 950 ft bgs; NO Sanitary Seal (completed in 1932).
pump rate - 1,568 gpm (bowl depth 230 ft bgs).
Nearest MTBE detection in drinking water production well:
SA-16: 0.13 ug/L in 2005.
SA-16: 0.28 ug/L in 2008.

OCWD-MTBE-001-253390

A 87

15742 Beach Boulevard, Huntington Beach

Multiple fuel leaks were detected at the site in 1988 and 1991 during facility (tanks, dispensers, and pipes) upgrades / replacements (according to site reports), and indicated during investigations up to 2001 (demolition activities).

Site had multiple facility inspection failures or violations. Agencies made multiple requests for action up to the present. RP continued missing regulated deadlines, continued non-compliance and deficiencies.

MTBE 1st tested in gw. 3/4/96 in MW-2 and 3/5/96 in MW-6.

MTBE 1st detected in groundwater. 3/5/96 in MW-6 - 880 ug/L (NOT TESTED AGAIN FOR 4.5yrs).

Max MTBE detected in a gw monitoring well: 12/3/98 in MW-12 - 14,000 ug/L.

TBA 1st tested in groundwater. 9/6/00 in MW-5 (reporting detection limit - 500 ug/L).

TBA 1st detected in groundwater. 12/5/00 in MW-7 - 830 ug/L.

Max TBA detected in a gw monitoring well: 2/20/05 - 15,000 ug/L in MW-6.

TBA SPIKES in 2001 in MW-5 & MW-6; and 2004 in BC-3.

DIPE SPIKES in 2001 in MW-16 and MW-20d.

3 saturated zones are identified:

semi-perched gw zone (Delta, 2001):

"upper" gw zone: from ~25 to ~40 ft bgs.

"lower" gw zone: from ~40 to ~45 ft bgs.

Talbert Aquifer: top at ~65 ft bgs (aquifer separating semi-perched fm Alpha less competent or absent ~2,000 ft E).

(Korrex, Site Summary; Former Exxon #4283 - 2005).

Off Site - variable shallow gw flow direction: farthest downgradient wells: near site margin wells MW-17 (S).

Off-site Well MW-17 in S direction:

MTBE 1st tested: 3/5/96.

MTBE 1st detected: 12/3/98 - 48 ug/L.

Max MTBE: 12/3/98 - 48 ug/L.

TBA 1st tested: 4/2/03 (RDL - 10.0 ug/L).

TBA 1st detected: 9/7/060 - 119 ug/L.

Max TBA: 9/7/060 - 119 ug/L.

Semi-perched "upper" groundwater flow direction is N (Feb-08) to S (Sep-01) (Delta reports).

Semi-perched "lower" groundwater flow direction is S to SE (Delta report).

Deeper groundwater (Talbert and Alpha) flow direction is S or SW (OCWD).

Vertical gw gradient downward - (OCWD).

Remediation: DPE initiated in 2002, intermittent operation thru 2008; NO groundwater capture initiated.

Apr-89 - USTs removed; 3 ft of free product detected in MW-1.

Aug-89 - begin investigation of lateral extent of soil contamination.

Oct-89 - free product removal system installed in MW-1; SMO after detection.

1990 - SVE pilot test (29 ft RCH - "... maybe over estimated. ... AG 1991; per Delta 11/13/01, p.3 OCKCA-MTBE-063446)

Aug-92 - aquifer test - 88 ft capture zone at 5 gpm.

1994 - additional SVE pilot test; "... SVE would not be a feasible method of soil remediation..." (RESNA, 1994).

May-96 - DPE pilot test.

1 of 2

OCWD-MTBE-001-261031

47 - SVE initiated

Feb-00 - MTBE first tested in soil.
 Jul-01 - first vertical assessment conducted to "... provide a vertical assessment of ... MTBE in soil."
 Oct-01 - UST, piping, dispenser removal, site demolition.
 Sep-02 - DPE initiated 13yrs after gw contamination identified; 7yrs after DPE pilot test completed.

MTBE and TBA groundwater plumes have migrated off site W (4/8/08 Delta - Quarterly Monitoring Report, Arco #1887, 16742 Beach Blvd, Huntington Beach OCHCA Case No. 88U1121)

Historic MTBE and TBA gw plumes have not been delineated laterally.
 Recent MTBE and TBA gw plumes have not been delineated laterally.
 MTBE and TBA gw plumes have not been delineated vertically

Groundwater conduits (potential migration paths from shallow saturated zones to deeper saturated zones):

Nearest well in Shallow Aquifer: W-3100 - aggl/ir well ~500 ft SE of site.

Drilled to: unknown_

Screened: unknown_

Sanitary seal: unknown_ (unlikely).

pump rate: unknown_

Top of Shallow zone - ~58 ft bgs.

Bottom of Shallow zone - ~151 ft bgs.

Top of Principal Aquifer - ~154 ft bgs.

Nearest well in Shallow Aquifer: W-3090 - domestic well ~480 ft SSW of site.

Drilled to: 252 ft bgs.

Screened: unknown_

Sanitary seal: unknown_ (unlikely).

pump rate: unknown_

Top of Shallow zone - ~62 ft bgs.

Bottom of Shallow zone - ~150 ft bgs.

Top of Principal Aquifer - ~162 ft bgs.

Nearest well in Shallow Aquifer: W-16805 - aggl/ir well ~480 ft SW of site.

Drilled to: 252 ft bgs.

Screened: unknown_

Sanitary seal: unknown_ (unlikely).

pump rate: unknown_

Top of Shallow zone - ~58 ft bgs.

Bottom of Shallow zone - ~148 ft bgs.

Top of Principal Aquifer - ~160 ft bgs.

Nearest drinking water production well: HB-3A - (Principal Aquifer) ~2,000 ft SW of site - downgradient.

Drilled to: 738 ft bgs.

Screened: 370 to 386, 395 to 430, 490 to 510, 520 to 560, and 585 to 640 ft bgs.

Sanitary seal - YES.

pump rate - 1,750 gpm.

Top of Shallow zone - ~67 ft bgs.

Bottom of Shallow zone - ~142 ft bgs.

Top of Principal Aquifer - ~148 ft bgs.

MTBE has not been detected in well HB-3A.

Nearest MTBE detection in drinking water production well.

NB-TAMD: 0.12 ug/L in 2005.

NB-TAMD: 0.04 ug/L in 2008.

Mobil #18-668
16230 Harbor Blvd, Fountain Valley *FP*

Unauthorized Release in Oct-2000 from leaking remediation system. Additional Fuel leak identified in Geotracker in 1989; FREE PRODUCT present, but ineffective groundwater remediation - continued off-site contaminant migration.

MTBE 1st tested in gw: 1996.

MTBE 1st detected in groundwater: 2/13/96 in RW-10 - 72,000 ug/L (south site-margin well).

Max MTBE detected in a gw monitoring well: 3/26/98 in MW-6 and MW-14 - 130,000 ug/L. *offsite*

TBA 1st tested in groundwater: Jun-00.

TBA 1st detected in groundwater: Oct-00 (per Komex).

Max TBA detected in a gw monitoring well: 12/5/01 in well MW-7 - 180,000 ug/L. *offsite*

2 saturated zones are identified:

semi-perched gw zone - ~10 to ~40+ ft bgs (semi-perched gw zone has not been defined - deepest screen is 38 ft).

Talbert Aquifer: top at ~95 ft bgs (1st Talbert sand is ~95 ft bgs).

Semi-perched zone - gw flow direction: S.

Shallow zone - gw flow direction: SSW.

Alpha Aquifer - gw flow direction: SW.

MTBE detected in all on-site and off-site wells except MW17 (off-site). *+ MW8*

Remediation: GWE initiated in 1992, again several times, but stopped 2004, NO gw capture initiated.

Sep-89 - leak discovered.

1990 - USTs removed.

Jun-90 - SVE initiated.

Jul-90 - aquifer test conducted - ROI calculated >100 ft;

Feb to Aug-91 - FREE PRODUCT recovery in MW/9/EW/2.

Jan-92 - gw P&T initiated.

Oct-93 - gw P&T initiated - 4 years after detected gw contamination (Geotracker).

Mar-94 - GW P&T initiated (has not controlled downgrad migration of MTBE and TBA (Komex, 2005).

Mar-94 - VE initiated.

Jun-95 - VE system discontinued.

Feb to Aug-96 - ORC installed in several wells.

Nov-96 to Mar-98 - gw purging conducted in several wells.

Mar-01 - tank cavity well installed.

Jan to Sep-03 - gw P&T discontinued.

Sep-03 - gw P&T initiated.

Mar-04 gw P&T discontinued again.

Aug to Sep-04 - natural attenuation study conducted.

Aug-06 - confirmation soil borings.

MTBE and TBA groundwater plumes have migrated off site ⁵ N-S-W (6/12/08 ETIC - Site Status and Groundwater Monitoring Report, Second Quarter 2008 (28 January 2008 to 30 April 2008), ExxonMobil Oil Corporation Service Station 18668, 16230 Harbor Boulevard, Fountain Valley, California 92708, OCHCA Case #89UT176.

Historic MTBE and TBA gw plumes have not been delineated laterally.

Recent MTBE and TBA gw plumes have not been delineated laterally.

MTBE and TBA gw plumes have not been delineated vertically.

Groundwater conduits (potential migration paths from shallow saturated zones to deeper saturated zones):

13 private wells within 2000 feet S of site - 5 in Talbert, 2 in Alpha, 1 in Alpha / Beta Aquifers.

Nearest well in Shallow Aquifer: W-17105 - domestic well ~100 ft NE of site.

Drilled to 135 ft bgs (Shallow Aquifer).

Screened: - unknown.

Sanitary seal - unknown (probably not).

pump rate - unknown.

Top of Shallow zone - ~88 ft bgs,

Bottom of Shallow zone - ~251 ft bgs.

Top of Principal Aquifer - ~310 ft bgs.

Nearest drinking water prod well: FV-8 - (Principal Aquifer) ~2,000 ft NW of site - upgradient.

Drilled to 920 ft bgs.

Screened: 312 to 420, 456 to 565, and 600 to 864 ft bgs.

Sanitary seal - YES.

pump rate - 2,500 gpm.

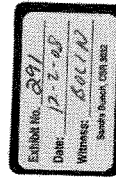
Top of Shallow zone - ~86 ft bgs,

Bottom of Shallow zone - ~266 ft bgs.

Top of Principal Aquifer - ~328 ft bgs.

Arco #6160
13361 Harbor Boulevard, Garden Grove
Nearby Wells

WELL_NAME	STAD1	OWNER_WELL_NAME	SWN	WPF	TYPE	SUBTYPE	USE	STATUS	OWNER_NAME	WORK_COMPLETE	BORE_DEPTH	SAN_SEAL	GS_DATE	GS_ELEV	YEAR_ENTERED			
GG-26	968	Well No. 26	05S/10W-03E01	101-07-18-A	PRODUCT	SINGLE	LGYS	ACTIVE	GARDEN GROVE	5/16/1988 0:00	1120	YES	12/28/1992 0:00	98.5	1990			
W-2008	2008		05S/10W-03E02		PRODUCT	SINGLE	UNKNOWN	UNKNOWN	PRIVATE	8/16/1983 0:00		UNKNOWN	8/1/1991 0:00	100	1991			
B-8170	8170	B-1	05S/10W-04H00		NA	NA	NA	DESTROY	UNKNOWN	1/13/1992 0:00	72	UNKNOWN	12/23/1992 0:00	90	1992			
W-16669	16669	Well #50	05S/10W-04H00	100-06-12-B	PRODUCT	SINGLE	AGR/IRR	ABANDON	GARDEN GROVE	1/7/1945 0:00	213	UNKNOWN	9/1/2000 0:00	93.5	2000			
CASING_NAME	STAD1	STAD2	DEPTH_FROM	DEPTH_TO	TYPE	ZONE	DIA_IN	DIA_TYPE	MATERIAL	THICK_IN	SCHEDULE	JOINT_TYPE	SLOTSIZE_IN	SLOTLENG_IN	SLOTWID_IN	SLOT_FT	OPEN_AREA_PCT	DESCRIPTION
GG-26/1	968	969	0	400	CONDUCTOR		26		STEEL		unk	UNKNOWN						CONDUCTOR, 26-inch dia.
GG-26/1	968	969	0	395	BLANK		18		STEEL	0.31	unk	UNKNOWN						BLANK, 18-inch dia.
GG-26/1	968	969	395	470	BLANK		16		STEEL	0.31	unk	UNKNOWN						BLANK, 16-inch dia.
GG-26/1	968	969	470	800	SCREEN	1	16		UNKNOWN		unk	UNKNOWN						SCREEN, 16-inch dia.
GG-26/1	968	969	800	920	BLANK		16		STEEL	0.31	unk	UNKNOWN						BLANK, 16-inch dia.
GG-26/1	968	969	920	1060	SCREEN	2	16		UNKNOWN		unk	UNKNOWN						SCREEN, 16-inch dia.
GG-26/1	968	969	1060	1090	BLANK		16		STEEL	0.31	unk	UNKNOWN						BLANK, 16-inch dia.
B-8170	8170		unk	unk	unk	unk	unk	unk	unk	unk	unk	unk	unk	unk	unk	unk	unk	unk
W-16669/1	16669	16670	unk	unk	unk	unk	unk	unk	unk	1	unk	unk	unk	unk	unk	unk	unk	unk
W-2008/1	2008	2009	0	406	BLANK		12	ID	STEEL	0.1	unk	UNKNOWN						BLANK, 12-inch dia.
W-2008/1	2008	2009	406	416	MILLS KNIFE	1	12	ID	UNKNOWN		unk	UNKNOWN		2.75	0.36	10	2.31	>ASING, 12-inch dia., 0
W-2008/1	2008	2009	416	440	SLOTTED CASING		12	ID	STEEL	0.1	unk	UNKNOWN						BLANK, 12-inch dia.
W-2008/1	2008	2009	440	460	BLANK		12	ID	UNKNOWN		unk	UNKNOWN		2.75	0.36	10	2.31	>ASING, 12-inch dia., 0
W-2008/1	2008	2009	460	484	MILLS KNIFE	2	12	ID	UNKNOWN		unk	UNKNOWN						BLANK, 12-inch dia.
W-2008/1	2008	2009	484		SLOTTED CASING		12	ID	STEEL	0.1	unk	UNKNOWN						BLANK, 12-inch dia.



Arco #6036

13142 Goldenwest Avenue, Westminster, CA

Unknown whether Unauthorized Release Reports were prepared. However, fuel leaks identified in literature and Geotracker in 1986 and 1999; FREE PRODUCT present; occasional remediation.

Regulating Agency cited multiple deficiencies, made multiple requests for additional investigation and remediation.

MTBE 1st tested in gw: 12/14/95 in MW-6 (site margin well - NW site corner).

MTBE 1st detected in groundwater: 12/14/95 in MW-6 - 9,300 ug/L (site margin well - NW site corner).

Max MTBE detected in a gw monitoring well: 3/26/97 in MW-W - 320,000 ug/L.

FREE PRODUCT 1st measured 3/27/90 in MW-W.

TBA 1st tested in gw: 9/25/00 in well MW-11 (RDL up to 10,000 ug/L for 1yr, eventually 1st detected at 1,900 ug/L).

TBA 1st tested: 9/25/00 in well MW-6 (RDL up to 10,000 ug/L for 1yr, not tested for another year; probably present).

TBA 1st detected in gw: 9/25/00 in MW-12 - 530 ug/L (RDL up to 10,000 ug/L for 1yr in other wells).

Max TBA detected in a gw: 11/25/02 in well MW-W - 25,000 ug/L (FP; RDL up to 20,000 ug/L prior to detection).

4 saturated zones are identified:

[upper] semi-perched gw zone - 5 to ~15 ft bgs (Delta).

[middle] semi-perched gw zone - ~25 to ~30+ ft bgs (Delta).

[deeper] semi-perched gw zone - ~50 to ~60+ ft bgs (Delta).

Bolsa Aquifer below semi-perched zone - top at ~80 ft bgs (Delta).

Semi-perched gw flow direction is SW (Delta).

Bolsa Aquifer gw flow direction is SW (OCWD).

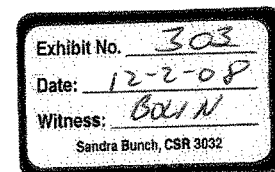
The vertical gw flow direction is downward (Delta).

Off Site - shallow gw flow direction SW - farthest OFF-SITE wells - ~250 feet WSW (VA-1) & W (VA-2) from the site:

- wells VA-1s & VA-1d (screened 5 to 15 & 29 to 30 ft bgs) - too shallow, insufficient intermediate distance wells.
- wells VA-2s & VA-2d (screened 5 to 15 & 28 to 29 ft bgs) - too shallow, insufficient intermediate distance wells.
- 1st tested for MTBE 5/9/00 and TBA 9/25/00 (RDL 50 ug/L).
- 1st MTBE detected 2/27/02 in VA-2s - 5.9 ug/L; 5/31/05 in VA-2d - 37 ug/L. NO detects in VA-1s or d; NO TBA.
- MTBE and TBA detections in intermediate distance wells: MW-8, MW-9, & MW-10:
 - MW-8: 1st MTBE 11/29/01 - 110 ug/L, max MTBE 1/17/03 - 830 ug/L.
 - MW-8: 1st TBA 2/27/02 - 140 ug/L, max TBA 5/27/03 - 250 ug/L.
 - MW-9: 1st MTBE detect 8/16/01 - 270 ug/L; max MTBE 2/27/02 - 520 ug/L.
 - MW-9: 1st TBA not detected (RDL up to 500 ug/L).
 - MW-10: 1st MTBE detect 12/10/99 - 63 ug/L; max MTBE 9/25/00 - 1,200 ug/L.
 - MW-10: 1st TBA detect 9/8/03 - 150 ug/L; max TBA 12/8/03 - 190 ug/L (prior RDL up to 500 ug/L).

Site Margin Wells - MW-6, MW-7, MW-11, and MW-13:

- very high MTBE and TBA in MW-6 and MW-11; MW-13 too deep, MW-7 not in optimum location.



Remediation: DPE initiated 2001 - CONTAMINATED GW NOT CAPTURED.

Dec-86 - Three USTs installed in NW part of site; FREE PRODUCT was observed on gw.
Jan-87 - Four steel USTs were removed from NE part of site; contaminated soil was excavated.
Jan-88 - site margin wells MW-6 and MW-7 installed.
Dec-89 - quarterly gw monitoring initiated.
Apr-90 - mobil SVE system operated at the site for seven days.
Feb-94 - off-site well MW-10 was installed.
Nov-98 - Overpurging initiated in NW tank pit area.
Jan-99 - FREE PRODUCT 1st appears in MW-W & MW-X (tank pit wells in NW site corner) - NEW RELEASE.
Jan-99 - Arco consultant discontinued overpurging at the site.
Jun-99 - OCHCA insisted Arco resume FREE PRODUCT REMOVAL.
Oct-99 - OCHCA required Arco to prepare a Site Conceptual Model showing lateral & vertical extent of MTBE.
May-00 - Arco consultant identified multiple, nearby potential conduits - WM-75, GGM-2, YANG-GG, WM-SC4, etc.
May-00 - Arco consultant identified 3 on-site contaminant sources areas - fmr NE UST pit, dispensers, NW UST pit.
Aug to Sep-00 - HVDPE pilot test.
Dec-00 - GW ROI estimated at 50 feet.
Dec-01 - GWE initiated.
Oct-05 - RP consultant reports GWE effectively hydraulically controls gw contamination beneath site.
- gw contamination not delineated laterally or vertically - hydraulic gw control cannot be confirmed.

MTBE and TBA groundwater plumes have migrated off site SW (5/3/07 Delta - Quarterly Update Report Submittal, Arco Facility No. 6036, OCHCA Case No. 89UT221, 13142 Golden West Street, Westminster, Atlantic Richfield Company Quarterly Update Report, First Quarter 2007, May 3, 2007).

Historic MTBE and TBA gw plumes have not been delineated laterally.
Recent MTBE and TBA gw plumes have not been delineated laterally.
MTBE and TBA gw plumes have not been delineated vertically.

Groundwater conduits (potential migration paths from shallow saturated zones to deeper saturated zones):

Nearest well in Shallow Aquifer: W-16937 - agg/irr well ~160 ft NW of site.

Drilled to 200 ft bgs (Shallow Aquifer).
Screened: - unknown.
Sanitary seal - unknown (probably not).
pump rate - unknown.
Top of Shallow zone - ~65 ft bgs,
Bottom of Shallow zone - ~317 ft bgs.
Top of Principal Aquifer - ~341 ft bgs.

Nearest drinking water prod well: WM-75A - (Principal Aquifer) ~1,600 ft S of site - downgrad (Principal).

Drilled to 1,041 ft bgs.
Screened: 410 to 480, 611 to 631, 676 to 696, 881 to 896, 916 to 951, and 961 to 996 ft bgs.
Sanitary seal - YES.
pump rate - ____.
Top of Shallow zone - ~64 ft bgs,
Bottom of Shallow zone - ~298 ft bgs.
Top of Principal Aquifer - ~320 ft bgs.